

# Ankur Sikarwar

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## Education

Present Sept 2024	<b>Université de Montréal</b> Master's of Science (Thesis)   Computer Science   <i>Start Date: 2 September 2024</i> GPA: 4.2 / 4.3	Montreal, Canada
June 2021 July 2017	<b>Birla Institute of Technology, Mesra</b> Bachelor of Engineering   Electronics & Communication <i>First Class with Distinction</i>	India

## Research & Industrial Experience

Present Aug 2024	<b>Mila - Quebec AI Institute</b> 🌐 Research Assistant   Advisor: <a href="#">Prof. Aishwarya Agrawal</a> <ul style="list-style-type: none"><li>Working on VLM-based multi-agent frameworks for collaborative spatial reasoning and communication.</li><li>Developed <i>EARL</i>, a reinforcement learning-based autoregressive model for text-guided image editing, achieving state-of-the-art results with significantly less training data.</li></ul>	Montreal, Canada
Aug 2023	<b>Massachusetts Institute of Technology   Center for Brains, Minds and Machines</b> 🌐 Research Fellow   Advisor: <a href="#">Dr. Andrei Barbu</a> , <a href="#">Dr. Mengmi Zhang</a> <ul style="list-style-type: none"><li>Built <i>WorM</i>, a comprehensive benchmark of 1M trials and 10 tasks, to study working memory in AI systems.</li><li>Explored orthogonal representation regularization to mitigate forgetting and improve compositional generalization in continual learning tasks.</li></ul>	Cambridge, USA
Jun 2024 Oct 2022	<b>Agency for Science, Technology and Research   Institute for Infocomm Research</b> 🌐 Research Engineer   Advisor: <a href="#">Dr. Mengmi Zhang</a> <ul style="list-style-type: none"><li>Developed <i>SeCo</i>, a self-supervised framework with external memory for context-aware visual reasoning.</li><li>Designed large-scale Turing test frameworks to benchmark vision-language AI models against humans.</li><li>Developed curriculum algorithms to optimize continual learning, enhancing forward transfer and reducing catastrophic forgetting.</li></ul>	Singapore
Aug 2022 July 2021	<b>Microsoft Research</b> 🌐 Research Intern   Advisor: <a href="#">Dr. Navin Goyal</a> <ul style="list-style-type: none"><li>Developed multimodal models for compositional generalization in grounded language understanding tasks.</li><li>Worked on the mechanistic interpretability of grounding and composition in multimodal transformers.</li><li>Explored modular neural networks, enhancing faithfulness of individual reasoning modules.</li></ul>	Bangalore, India
July 2021 Jan 2021	<b>Harvard University   Kreiman Lab</b> 🌐 Research Assistant   Advisor: <a href="#">Prof. Gabriel Kreiman</a> <ul style="list-style-type: none"><li>Explored how question semantics influence attention and grounding in visual question answering models.</li><li>Investigated the role of co-attention transformer layers in multimodal transformers, comparing model attention with human attention to improve interpretability.</li></ul>	Cambridge, USA
July 2019 May 2019	<b>IIIT, Hyderabad   Center for Visual Information Technology</b> 🌐 Research Intern   Advisor: <a href="#">Prof. Avinash Sharma</a> <ul style="list-style-type: none"><li>Worked on an end-to-end network for reconstructing 3D models of humans from monocular video.</li><li>Developed tools for pre-processing &amp; generating 3D mesh data of humans from a vertex-based template model.</li></ul>	Hyderabad, India

## Publications

### The Promise of RL for Autoregressive Image Editing. 📄 🌐

Saba Ahmadi\*, Rabiul Awal\*, [Ankur Sikarwar](#)\*, Amirhossein Kazemnejad\*, Ge Ya Luo, Juan A. Rodriguez, Sai Rajeswar, Siva Reddy, Christopher Pal, Benno Krojer, Aishwarya Agrawal (\*Denotes equal contribution)  
*Conference on Neural Information Processing Systems.* [NeurIPS'25]

### Decoding the Enigma: Benchmarking Humans and AIs on the Many Facets of Working Memory. 📄 🌐

[Ankur Sikarwar](#), Mengmi Zhang  
*Conference on Neural Information Processing Systems.* [NeurIPS'23]

### Learning to Learn: How to Continuously Teach Humans and Machines. 📄 🔗 🎥

Parantak Singh, You Li, [Ankur Sikarwar](#), Weixian Lei, Daniel Gao, Morgan Bruce Talbot, Ying Sun, Mike Zheng Shou, Gabriel Kreiman, Mengmi Zhang

International Conference on Computer Vision.

[ICCV'23]

### When Can Transformers Ground and Compose: Insights from Compositional Generalization Benchmarks. 📄 🔗 🎥

[Ankur Sikarwar](#), Arkil Patel, Navin Goyal

Conference on Empirical Methods in Natural Language Processing.

[EMNLP'22 (Oral)]

### Reason from Context with Self-supervised Learning. 📄

Xiao Liu, [Ankur Sikarwar](#), Joo Hwee Lim, Gabriel Kreiman, Zenglin Shi, Mengmi Zhang

[In Review]

### Human or Machine? Turing Tests for Vision and Language. 📄

Mengmi Zhang, Giorgia Dellaferriera, [Ankur Sikarwar](#), Marcelo Armendariz, Noga Mudrik, Prachi Agrawal, Spandan Madan, Mranmay Shetty, Andrei Barbu, Haochen Yang, Tanishq Kumar, Shui'Er Han, Aman Raj Singh, Meghna Sadwani, Stella Dellaferriera, Michele Pizzochero, Brandon Tang, Hanspeter Pfister, Gabriel Kreiman

[In Review]

### On the Efficacy of Co-Attention Transformer Layers in Visual Question Answering. 📄

[Ankur Sikarwar](#), Gabriel Kreiman

Preprint.

## Achievements and Awards

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**UdeM-Bourse d'exemption, 2024** Awarded the UdeM-Bourse d'exemption grant of CAD 15,149 to pursue graduate studies.

**Mila Scholarship, 2024** Awarded the Mila scholarship of CAD 27,000/year to pursue graduate studies.

**Fujitsu Laboratories Fellowship, 2023** 🌟 Received the prestigious Fujitsu Laboratories fellowship for [MIT Center for Brains, Minds and Machines](#) Summer Program. Only undergraduate student to be selected from a pool of 300+ graduate-level applicants.

**iHack Alpha: AI-Enabled Solutions, 2021** Among Top 8 Finalists globally.

**NASA International Space Apps Challenge, 2019 | Global Nominee** 🌟 For designing "[Prophet: A distributed system for identifying and mitigating lunar dust for future moon missions.](#)"

**Bengaluru Tech Summit Global Hackathon, 2019 | Top 20 Finalists** 🌟 🎥 For developing "FOCUS: A Wearable Device for People with Speech and Motor Impairments."

**Siemens MakeIT Real Hackathon, 2018 | Winner** 🌟 🌟 For building the winning prototype "[TetraChrome Lenses: Smart Glasses for Visually Impaired People](#)" within 24 hours.

## Volunteering and Leadership Positions

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### Academic Service

2022-Present

- Served as a peer reviewer for top-tier conferences including NeurIPS'25, NeurIPS'23, EMNLP'23, ACL'23, EMNLP'22.

### Journal Club Organizer

2022-2024

- Led weekly reading sessions at the Deep NeuroCognition Lab, A\*STAR Singapore, selecting papers, inviting guest speakers, and moderating discussions.

### National Service Scheme

2017-2021

- Actively participated in STEM outreach programs, mentoring and engaging underprivileged students through hands-on activities and demonstrations.
- Promoted accessibility in STEM by building assistive technologies for visually impaired students; tested and refined prototypes with students at a school for the blind.

## Talks

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### "Decoding the Enigma: Benchmarking Humans and AIs on the Many Facets of Working Memory"

- > [Libedinsky Lab, National University of Singapore](#) 🌟

July 2023

### "When Can Transformers Ground and Compose: Insights from Compositional Generalization Benchmarks"

- > Lab Sabha, [Microsoft Research India](#)

July 2022

### "On the Efficacy of Co-Attention Transformer Layers in Visual Question Answering"

- > [Kreiman Lab, Harvard University](#) 🌟

June 2021